SULEYMANOV, D.M.; BASHINDZHAGYAN, I.S.; MKRTCHYAN, E.A.

Conditions from the viewpoint of engineering geology in the middle Terter Valley. Trudy Inst. geol. AN Azerb. SSR 23:29-66 '64.
(MIRA 18:7)

BASHINDZHAKELI, N. D.

"Ecological and Forestry Characteristics of Caucasian Fir." Cand Biol Sci, Acad Sci Georgian SSR, Tbilisi, 1953. (RZhBiol, No 1, Sep 54)

SO: Sum 432, 29 Mar 55

BASHINDZHAKELI [N.D.]

USSR/Forestry - Biology and Typology of the Forest. K-2

Abs Jour : Ref Zhur - Biol., No 3, 1958, 10559

Author : Bashindzhakeli
Inst :
Title : Natural Reproduction of Caucasian Fir After Cutting.

Orig Pub : Vestn. Tbilissk. botan. sada, 1956, No 63, 53-70

Abstract : Optimal conditions for reproduction of caucasian fir are created in fir-fescue plantations when the density is 0.5-0.6. In fir-fern and fir-oxalidaceae /kislitsiyevyy/ plantations reproduction is best at average density. In plantations of this latter type, when the density is sharply lowered, the process of disintegration of the dead cover is activated, and the soil conditions improve. All of this facilitates the emergence of shoots. In the fir-fern type of plantations, when density is increased to 0.3, reproduction declines as the soil becomes covered

Card 1/2

USSR/Forestry - Biology and Typology of the Forest. K-2

Abs Jour : Ref Zhur - Biol., No 3, 1958, 10559

/zaderneniye pochvy/.
In dense fir plantations reproduction is at a maximum when the gaps are of average dimensions, and in the less dense plantations--when the gaps are of small dimensions.

Card 2/2

4

USSR / Forest Science. Biology and Typology of Trees. K-2

Abs Jour : Ref. Zhur - Biologiya, No 17, 1958, No. 77481

Author : Bashindzhakeli, N. D.
Inst : Tbilisi Botanical Gardon, AS Georgian SSR
Title : Results of an Analysis of Growth of Casasus Fir and Eastern Spruce

Orig Pub : Vostn. Tbilissk botan. sada. AN GruzSSR, 1957, No 64, 7-20

Abstract : It is stated that fir and spruce as species participating directly in the creation of a dominant formation are characterized by the presence of three different periods of growth, in terms of intensity, the duration of which is determined by the conditions of the growth cycle. The beginning growth is slow, then is increased and, after culmination, is slow again. Under cover, such regularity is not observed in these species. Trees growing freely

Card 1/2

USSR / Forest Science. Biology and Typology of Trees. K-2

Abs Jour : Ref. Zhur - Biologiya, No 17, 1958, No. 77480

Author : Bashindzhakeli, N. D.
Inst : Tbilisi Botanical Garden, AS Georgian SSR
Title : Some Features of Even-Aged Fir Plantations

Orig Pub : Vestn. Tbilissk. botan. sada, AN GruzSSR, 1957, No 64, 21-25

Abstract : The Caucasus fir forms both varied-age and even-aged plantations, which are formed spontaneously. Fir plantations are adapted mainly to the middle and upper zones. Even-aged stands are usually single-stages, pure and quite old. Renewal under cover is almost absent; best results are observed in openings of average size. Restoration of even-aged firs is conditioned by the presence of openings.

Card 1/1

BASHINDZHAKELI, N.D.

Pecan culture in Tiflis. Vest.Bot.sada AN Gruz.SSR no.66:37-48 '60. (MIRA 14:10)

(Tiflis—Pecan)

BASHINDZHAKELI, N.D.

Cotoneasters in the Tiflis Botanical Garden and the prospects for their use in landscaping. Vest. Tbil. bot.sada no.69:3-16 '63.
(MIRA 17:10)

ACC NR: AP6036448 SOURCE CODE: UR/0370/66/000/006/0142/0145

AUTHORS: Gurin, V. N. (Leningrad); Obukhov, A. P. (Leningrad); Terent'yeva, Z. P. (Leningrad); Bashinskaya, I. R. (Leningrad)

ORG: none

TITLE: The existence of intermetallic compounds in the system Nb-Zn

SOURCE: AN SSSR. Izvestiya. Metally, no. 6, 1966, 142-145

TOPIC TAGS: niobium, zinc, intermetallic compound, x ray analysis, crystal lattice parameter

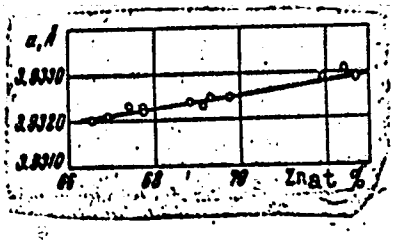
ABSTRACT: A new intermetallic compound of Nb and Zn was synthesized. The chemical composition, solubility in acids and bases at room temperature and elevated temperatures, and the lattice parameter of the compound were determined. The experimental results are summarized in graphs and tables (see Fig. 1). It was found that the compound had a stoichiometric composition of $NbZn_{2.0-2.7}$ and a copper type structure. The lattice parameter of the face-centered cubic lattice was a = 3.9325 Å.

UDC: 546.882'47:541.123.24

Card 1/2

ACC NR: AP6036448

Fig. 1. Dependence of the lattice parameter of compound $NbZn_{2.0-2.7}$ on the zinc content of the latter



Orig. art. has: 3 tables and 2 graphs.

SUB CODE: 11/ SUBM DATE: 13Sep64/ ORIG REF: 002/ OTH REF: 004

Card 2/2

L 1651-66 EWP(e)/EWT(m)/EWP(i)/ETC/EPF(n)-2/EWG(m)/EWP(t)/EWP(b) LJP(c)
JD/WW/JG/AT/WH
ACCESSION NR: AP5021548 UR/0286/65/000/013/0012/0012
661.888.685.002.2

AUTHOR: Gurin, V. N.; Obukhov, A. P.; Terent'yeva, Z. P.; Bashinskaya, I. R.

TITLE: Method of synthesizing metal disilicides. Class 12, No. 172285

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 13, 1965, 12

TOPIC TAGS: metal disilicide, vanadium disilicide, niobium disilicide, tantalum disilicide, disilicide synthesis

ABSTRACT: This Author Certificate introduces a method of synthesizing vanadium, niobium and tantalum disilicides by a reaction between metal and silicon taking place in a molten metal. In order to decrease the temperature of reaction, zinc is used as the molten metal and the process is conducted at the boiling point of zinc. Reaction products are subsequently separated from the molten metal. [AZ]

ASSOCIATION: Fiziko-tekhnicheskiy institut im. A. F. Ioffe AN SSSR (Physicotechnical Institute, AN SSSR)

SUBMITTED: 03Jul64 ENCL: 00 SUB CODE: IC, MM
NO REF SOV: 000 OTHER: 000 ATD PRESS: 4093
Card 1/1

NIKITIN, A.V.; Prinimali uchastiye: SHCHEGOL', V.M.; KUR, I.P.; ANTONIK, I.V.; ZHERBUKH, I.N.; LOZINSKAYA, K.A.; BASHINSKAYA, L.I.

Finishing television cabinets by polyester varnishes. Bum i der. prom. no.2:53 Ap-Je '63. (MIRA 17:2)

BASHINSKAYA, N.B.; KRYUCHKOV, S.S.; VETUKHNOVSKIY, Z.B.; MALOVITSKIY, V.S.

Progressive norms for the expenditure of varnish materials in the furniture industry. Der. prom. 13 no.12:18-21 D '64
(MIRA 18:2)

BASHINSKAYA, V.A. (Leningrad 46, M.Posadskaya ul., d. 19, kv.29)

Histogenesis of the human tongue. Arkh.anat.gist.i embr. 33 no.3:64-66 Jl-S '56. (MIRA 12:11)

1. Iz kafedry gistologii i embriologii (zav. - prof.G.S.Strelin) 1-go Leningradskogo med. instituta im. akad. I.P.Pavlova.
(TONGUE, anatomy and histology, histogenesis in humans (Rus))

BASHINSKAYA, V.A.

Experimental osteomyelitis and some aspects of its pathogenesis. Biul.eksp.biol. i med. 48 no.7:38-42 Jl '59. (MIRA 12:10)

1. Iz kafedry rentgenologii (zav. - chlen-korrespondent AMN SSSR prof.D.G.Rokhlin) i iz kafedry gistologii (zav. - prof. G.S.Strelin) I Leningradskogo meditsinskogo instituta imeni I.P.Pavlova (dir. A.I.Ivanov). Predstavlena deystvitel'nym chlenom AMN SSSR V.N.Chernigovskim.
(OSTEOMYELITIS - experimental)

BASHINSKAYA, V.A.

Course of experimental osteomyelitis in radiation sickness.
Med.rad. no.7:29-35 '61. (MIRA 15:1)

1. Iz kafedry gistologii i kafedry rentgenologii I Leningradskogo meditsinskogo instituta imeni akad. I.P. Pavlova.
(RADIATION SICKNESS) (OSTEOMYELITIS)

BASHINSKIY, G.

Communication and Traffic - Accounting

Systematizing auditor's work Sov. sviaz. no. 11, 1951.

9. Monthly List of Russian Accessions, Library of Congress, August 1952 1952, Uncl.

BASHINSKIY, S. V. DECEASED 1962/7

c. 1962

CONSTRUCTION

see ILC

BASHINSKIY, V. Yu.

BASHINSKIY, V. Yu. -- "Investigation of Adaptations to Wood-Milling Machine Tools." Min Higher Education USSR. Moscow, 1956. (Dissertation for the Degree of Candidate in Technical Sciences).

So: Knizhnaya letopis', No 8, 1956, pp 97-103

BASHINSKIY, V.Yu., kand. tekhn. nauk

Kinematics in milling curvilinear parts. Nauch. trudy MLTI no.6: 145-157 '56. (MIRA 11:12)
(Woodwork)

LEBEDEV, Viniamin Stepanovich, prof.; Prinimali uchastiye: ROMANOV, N.T., dots., kand. tekhn. nauk; BASHINSKIY, V.Yu., dots.; SHEYDIN, I.A., kand. tekhn. nauk, retsenzent; SMOLENSKIY, K.I., red.

[Technology of glued materials and boards] Tekhnologiia kleenykh materialov i plit. Moskva, Lesnaia promyshlennost', 1964. 497 p. (MIRA 18:1)

1. Nachal'nik tekhnologicheskoy laboratorii TSentral'nogo nauchno-issledovatel'skogo instituta fanery i mebeli (for Sheydin).

BASHIROV, A.

25478. Sotsialisticheskoye Sorevnovaniye--Metod Stroytel'stva Kommunizma. Po Leninskomy Puti, 1949, No. 6, S. 41-48

SO: Letopis' Zhurnal'nykh Statey, Vol. 34, Moskva, 1949

BASHIROV, A.G.

AUTHOR: Bashirov, A.G. 132-58-2-17/17

TITLE: On the Effectiveness of Geological Work (Ob effektivnosti geologicheskikh rabot)

PERIODICAL: Razvedka i Okhrana Nedr, 1958, Nr 2, pp 61-62 (USSR)

ABSTRACT: The author refers to the article of Yu.P. Pistsov published under the above title in Nr 7 of this periodical for 1957. Bashirov stresses the necessity to cut down the cost of the preliminary exploration of mineral deposits.

ASSOCIATION: Ministerstvo Geologii i Okhrany Nedr Kazakhskoy SSR (Ministry of Geology and Conservation of Mineral Resources of the Kazakh SSR)

Card 1/1 1. Geology 2. Minerals-Economic aspects

BASHIROV, A. N., KAMZOLKIN, V. V.

"Synthesis of Higher Aliphatic Alcohols by the Method of Direct Oxidation of Paraffinicn Hydrocarbons."

Report submitted at the Fifth World Petroleum Congress, 30 May - 5 June 1959. New York.

BASHKIROV, A.N.; KISTANOVA, A.I.

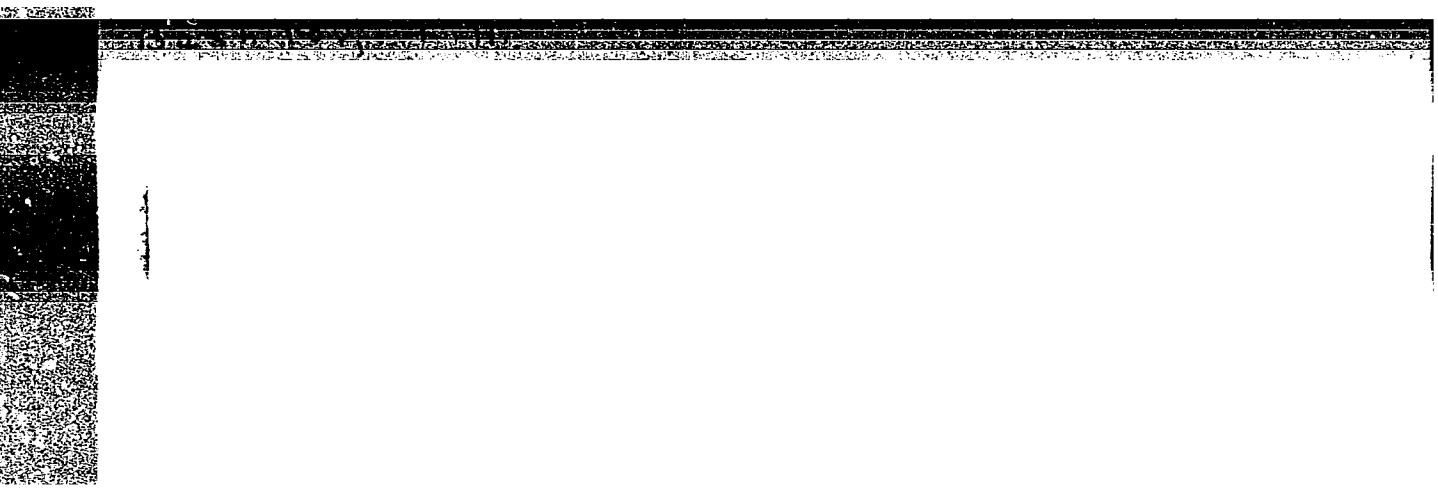
Composition of alcohols obtained in liquid phase oxidation of naphthene hydrocarbons. Dokl.AN SSSR 148 no.4:829-831 F '63. (MIRA 16:4)

1. Institut neftekhimicheskogo sinteza AN SSSR i Moskovskiy institut tonkoy khimicheskoy tekhnologii im. M.V.Lomonosova. 2. Chlen-korrespondent AN SSSR (for Bashkirov).
(Alcohols) (Naphthenes) (Oxidation)

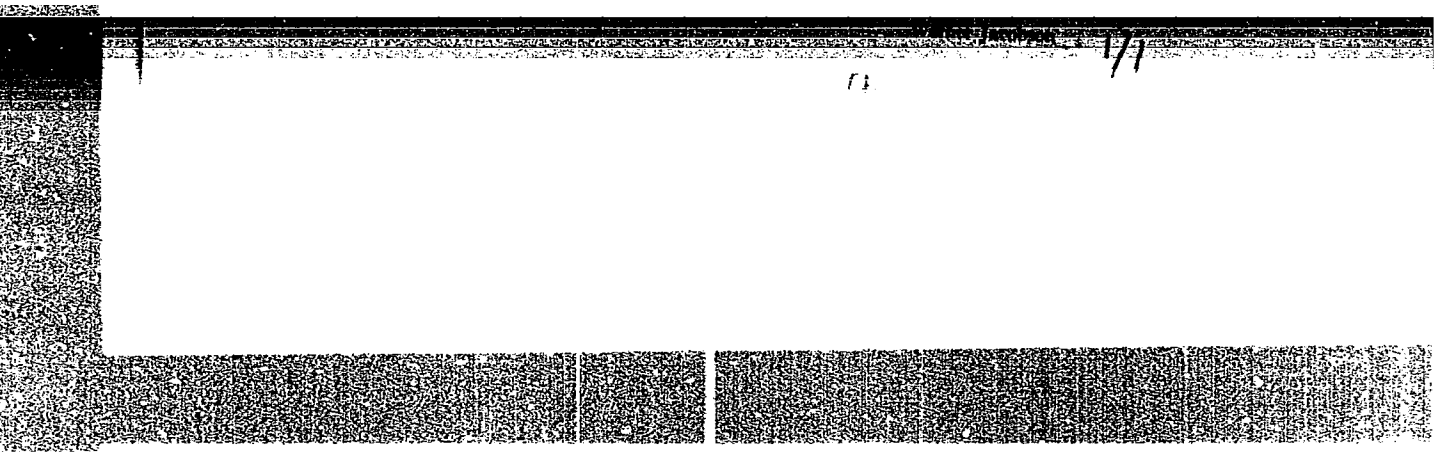
BASHIROV, B.G.

Spreading of oxidizing processes in the Tekeli deposit. Gor.zhur. no.9:64-67 S '60. (MIRA 13:9)

1. Tekeliyskiy kombinat.
(Tekeli (Taldy-Kurgan Province)--Lead mines and mining)
(Mine fires)



APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820008-8"



AKHMEDLI, M.K.; BASHIROV, E.A.

Physicochemical analysis in studying salts of cobalt with thiourea [in Azerbaijani with summary in Russian]. Uch. zap. AGU no.1:25-37 '57. (MIRA 10:12)

(Cobalt salts--Analysis) (Urea)

ACC NR: [illegible] SOURCE CODE: [illegible]

AUTHOR: Akhmedli, M. K.; Bashirov, E. A.; Glushchenko, E. L.; Zykova, L. I.

ORG: Azerbaydzhan State University im. S. M. Kirov, Baku (Azerbaydzhanskiy gosudarstvennyy universitet)

TITLE: Interaction of gallium ions with pyrocatechol violet

SOURCE: Zhurnal analiticheskoy khimii, v. 21, no. 8, 1966, 1022-1026

TOPIC TAGS: gallium, ion, gallium ion, ion interaction, ion concentration, pyrocatechol, pyrocatechol violet

ABSTRACT: Gallium forms colored compound with pyrocatechol violet at pH 5.75—6.7 in an acetate-hydrochloride medium. The components interact in a molar ratio of 1 : 2. The maximum absorption is at 580 nmol, the true molar extinction coefficient is 73,530, and the conditional instability constant is $5 \cdot 10^{14}$. Solutions obey Beer's law within the concentration range of 0.56--3.1 μg/ml of gallium. Such elements as Al^{3+}, In^{3+}, Fe^{3+}, Cu^{2+}, and Ti^{3+} interfere in the photometric determination of gallium; no interference is caused by alkali metals;

Card 1/2 UDC: 543.70

ACC NR: AP6033387

As (III, V), Cd^{2+}, Zn^{2+}, Pb^{2+}, Cr (III), Co^{2+}, Mo (VI), Sn (IV), Ni^{2+}, Tl (III), Sb (III) interfere only up to definite ratios. The method has been used for gallium determination in pure solutions. The relative experimental error is not more than 4%. The sensitivity of the method is 0.04 μg/ml. Orig. art. has: 6 figures and 3 tables. [Authors' abstract]

SUB CODE: 07/ SUBM DATE: 27Apr65/ ORIG REF: 005/ OTH REF: 002/

Card 2/2 vmb

BASHIROV, E. A., Cand Chem Sci -- (diss) "Study of the composition of ~~the~~ a new stained complex compound of cobalt and its determination by the photometric method." Baku, 1958. 22 pp with graphs (Min of Higher Education USSR, Azerbaydzhan State Univ im S. M. Kirov), 150 copies (KL, 35-58, 105)

AKHMEDLI, M.K.; BASHIROV, E.A.

Physicochemical analysis of colored complexes obtained from the reaction of thiourea cobalt complexes with silicate ions. Uch.zap. AGU no.2:27-36 '58. (MIRA 12:1)
(Silicates) (Cobalt compounds)

BASHIROV, B., student V kursa

Calculating the potential of nuclear forces in a third approximation. Sbor.stud.rab.Uz.GU no.2:129-138 '59. (MIRA 13:11)

1. Kafedra teoreticheskoy fiziki Uzbekskogo gosudarstvennogo universiteta.

(Nuclear forces)

BASHIROV, E.B., kand.biolog.nauk

Fundamental causes of seasonal variation in the quantity and quality of the semen of bulls and buffaloes in Azerbaijan. Zhivotnovodstvo 22 no.2:74-77 F '60. (MIRA 15:11)

1. Zaveduyushchiy laboratoriyey iskusstvennogo osemeneniya sel'skokhozyaystvennykh zhivotnykh Azerbaydzhanskogo instituta zhivotnovodstva.
(Azerbaijan--Bulls) (Azerbaijan--Buffaloes) (Semen)

USSR / Farm Animals. General Problems. Q-1

Abs Jour: Ref Zhur-Biol., No 23, 1958, 105631.

Author : Bashirov, E. B.
Inst : Azerbaydzhan Scientific Research Institute of Animal Husbandry and Veterinary Medicine.

Title : Effect of Antibiotics, Streptocid Album and Polyatomic Alcohols on the Viability and Fertilizing Ability of the Semen of the Buffalo, Bull and Ram.

Orig Pub: Elmi-tekhn. m'lumat bulleteni. Azerb. elmi-tedgigat heyvandarlyg ve baytarlyg inst., 1957, No 1 (2), 47-50.

Abstract: A yolk-citrate-glucose synthetic medium was supplemented with antibiotics (penicillin, streptomycin, biomycin, levomycetin, and albomycin, streptocid album (sulfanilamide), glycerin, and

BASHIROV, E. B.

"Reproductive biology and artificial insemination in water buffaloes."

report submitted for 5th Intl Cong on Animal Reproduction & Artificial Insemination, Trent, Italy, 6-13 Sep 64.

BASHIROV, F. B.

33309. Uskorennoye Formirovaniye Vinogradnykh Kustov. Vinodeliye I Vinogradarstvo SSSR, 1949, No. 10, c. 14-19

SO: Letopis' Zhurnal'nykh Statey Vol. 45, Moskva, 1949

BAS'IROV, F. D.

First all-Union conference of workers of agricultural production laboratories.
Vin SSSR 12, no. 5, 1952

BASHIROV, P.B.

"Theoretical principles in trimming grapevines.
Vin. SSSR 12, No. 9, 1952

1. BASHIROV, F.B.

2. USSR (600)

4. Viticulture

7. Principles in shaping grape vines. Vin.SSSR 12 no.10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, January 1953. Unclassified.

USSR / Cultivated Plants. Fruit Trees. Small Fruit Trees. M-7

Abs Jour: Ref Zhur-Biol., 1958, No 16, 73167.

Author : Bashirov, F. B.
Inst : Not given.
Title : Concerning Planting Systems of Grape.

Orig Pub: Sad i ogorod, 1956, No 9, 64-68.

Abstract: It is indicated that the square-pocket and square planting methods for grape are best carried out in rayons of open cultivation. In the new sovkhozes on the irrigated lands of the Volga-Don irrigation system, it is recommended to establish vineyards by the row method with support in the form of one-level and two-level trellises.

Card 1/1

BASHIROV, Farid Bashirovich; MEL'NIK, S.A., professor, retsenzent; NEGRUL', A.M., professor, retsenzent; PRITYKINA, L.A., redaktor; CHEBYSHEVA, Ye.A., tekhnicheskiy redaktor

[Growing grapes from suckers] Vyrashchivanie vinograda na pasynkakh. Moskva, Pishchepromizdat, 1957. 119 p. (MLRA 10:10)
(Viticulture)

BASHIROV, Farid Bashirovich

[Accelerated fruiting of young vineyards] Uskorennoe plodonoshenie molodykh vinogradnikov. Moskva, Gos.izd-vo sel'.-khoz. lit-ry, 1959. 207 p. (MIRA 13:5)
(Viticulture)

BASHIROV, I.A.

Role of gas as a basic energy carrier. Izv. vys. ucheb. zav.; neft' i gaz 8 no.3:16 '65. (MIRA 18:5)

1. Azerbaydzhanskiy institut nefti i khimii im. M. Azizbekova.

SPIRIN, A.A.; BASHIROV, I.A.

Investigating methods for selecting wire sizes for oil-field networks. Izv. vys. ucheb. zav.; neft' i gaz 8 no.4:64 '65. (MIRA 18:5)

1. Azerbaydzhanskiy institut nefti i khimii im. M.Azizbekova.

USENKO, P.V., mekhanik (Tashkent); BASHIROV, I.S. (Tashkent)

Central oiling station. Suggested by P.V. Usenko, I.S. Bashirov. Stroi. truboprov. 7 no.7:27 Jl '62. (MIRA 15:7)

1. Uchastok No.1 stroitel'nogo uchastka No.2 tresta Nefteprovodmontazh (for Usenko). 2. Nachal'nik uchastka No.1 stroitel'nogo uchastka No.2 tresta Nefteprovodmontazh (for Bashirov).
(Lubrication and lubricants)

L 08133-67 EWT(m)/EWT(1)/EWP(1) WW/JW/RM

ACC NR: AP6028212 SOURCE CODE: UR/0249/66/022/002/0020/0024

42
41
8

AUTHOR: Bashirov, M. Ya.

ORG: none

TITLE: Experimental investigation of the heat conductivity of binary and ternary liquid mixtures as a function of concentration and temperature

SOURCE: AN SSSR. Doklady, v. 22, no. 2, 1966, 20-24

TOPIC TAGS: heat conductivity, acetone, benzene, toluene, SOLUTION PROPERTY, SOLUTION CONCENTRATION

ABSTRACT: The following solutions were investigated: a) binary systems: toluene-benzene, benzene-acetone, toluene-acetone; b) ternary system: benzene-toluene-acetone. The purity of the starting materials was evaluated by the density and the index of refraction. The density of the liquids was measured by a capillary pycnometer, and the index of refraction with an Abbe refractometer. The values are shown in a table. The heat conductivity was investigated as a function of concentration and temperature. Considering the volatility of acetone in these systems, the measurements were made in the temperature interval from 15 to 45°C. The error in the heat conductivity measurements was evaluated at 2.5-3%. Experimental results are shown in a series of tables and curves. It was found that the heat conductivity in the system benzene-toluene increases with an increase in the benzene concentration. In the systems

Card 1/2

L 08133-67

ACC NR: AP6028212

benzene-acetone and acetone-toluene, it increases with an increase in the acetone concentration. In the system benzene-toluene-acetone, the heat conductivity increases with an increase in the acetone concentration. The change in the heat conductivity of these systems as a function of temperature obeys the general law

$$\lambda_t = \lambda_{15} - \alpha(t-15),$$

where, for the system benzene-toluene, α is equal to 4.8×10^{7} cal/cm-sec-degree^2; for the systems acetone-toluene and benzene-acetone, α is equal to 6.2×10^{7} cal/cm-sec-degree^2; for the system benzene-toluene-acetone, α is equal to 7.1×10^{7} cal/cm-sec-degree^2. "The author expresses his deep thanks to Doctor of Physical and Mathematical Sciences, Professor A. K. Abas-zade for his direction and advice in this work." Orig. art. has: 4 figures and 4 tables.

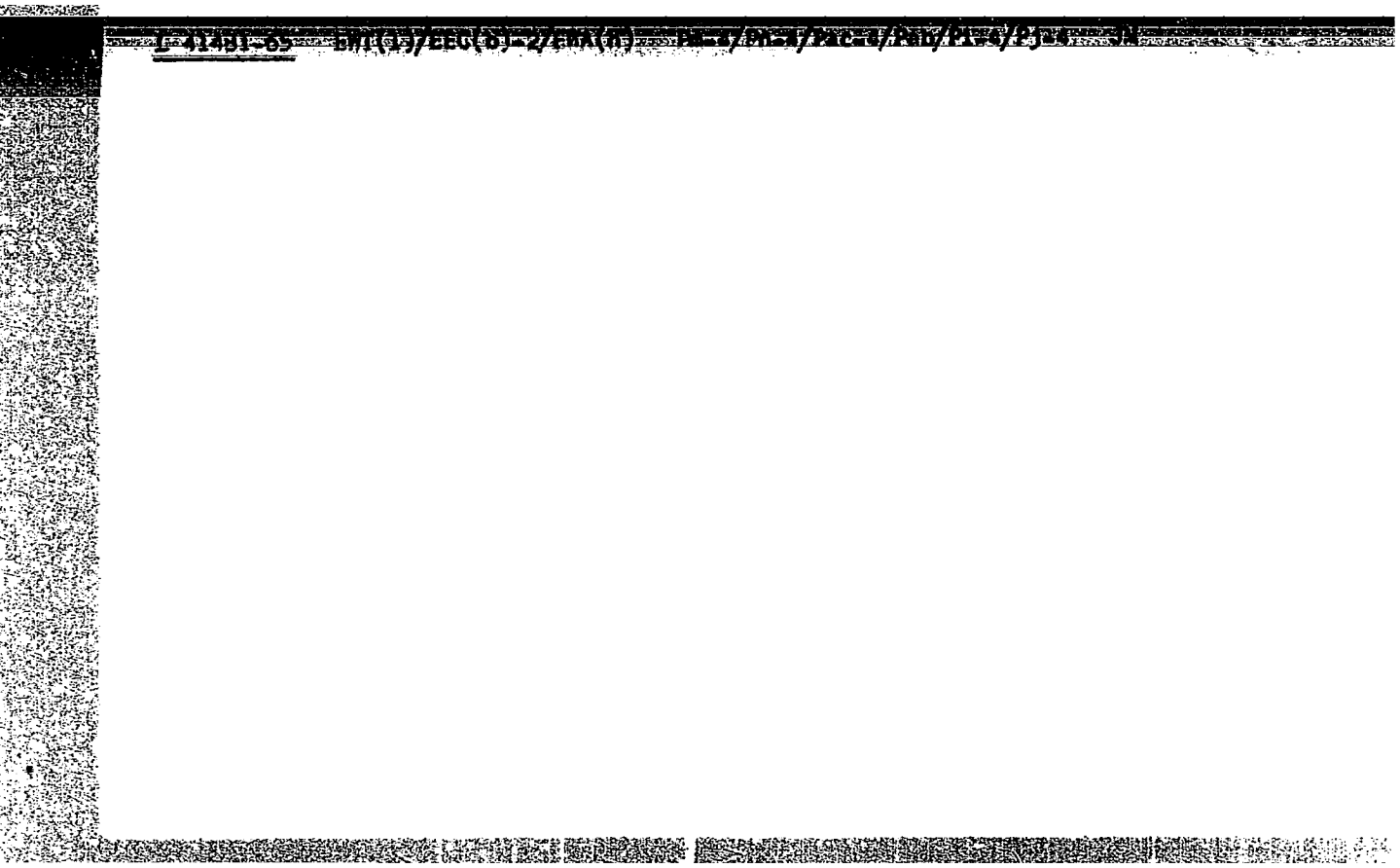
SUB CODE: 07, 20/ SUBM DATE: 26Jun65/ ORIG REF: 011

Card 2/2 nst

BASHIROV, Q.M.

New data on the Apsheron flora of Azerbaijan. Dokl. AN Azerb. SSR 20 no.7:47-50 '64. (MIRA 17:6)

1. Institut geologii AN AzerSSR. Predstavleno akademikom AN AzerSSR A.D. Sultanovym.



L 41481-65

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203820008-8"

BASHIROV, R.I

BASS, F.G.; BASHIROV, R.I.; TSIDIL'KOVSKIY, I.M.

Theory of isothermic galvanomagnetic and thermomagnetic phenomena in semiconductors. Izv.AN Azerb.SSR no.10:3-16 O '56.
(MLRA 10:3)

(Semiconductors)

BASHIROV, R.I.

AMIRKHANOV, Kh.I.; BASHIROV, R.I.; DAIBOV, A.Z.; TSIDIL'KOVSKIY, I.M.

Thermonagnetic phenomena in semiconductors. Izv.AN SSSR.Ser.fiz. 20 no.12:1519-1520 D '56. (MLRA 10:3)
(Semiconductors) (Thermomagnetism)

BASHIROV, R.I.

SUBJECT USSR / PHYSICS CARD 1 / 2 PA - 1558
AUTHOR BASIROV,R.I., CIDIL'KOVSKIJ,I.M.
TITLE The NERNST-ETTINGSHAUSEN-Effect in Germanium.
PERIODICAL Žurn.techn.fis, 26, fasc.10, 2195-2199 (1956)
Issued: 11 / 1956

The study of this NERNST-ETTINGSHAUSEN-effect (N.E.-effect) makes it possible to determine the temperature dependence of the mobility of the current carriers within the domain of actual conductivity as well as to solve the problem as to what scattering mechanism dominates at low temperatures. At first a formula for the dimensionless N.-E. field for the case of an atomic semiconductor is written down for the case of actual conductivity (where the concentrations N_- of the electrons and N_+ of the holes are equal to one another). This formula is then specialized for germanium (on the condition that $u_- \sim T^{-\alpha}$), and at $1 \leqslant b \leqslant 4$ ($b = u_-/u_+$) the equation $|\mathcal{E}_y| \sim T^{-\alpha-1}$ is found for the temperature dependence of the N.E.field. Only at high temperatures it is approximately true that $|\mathcal{E}_y| \sim T^{-\alpha}$. Next, a formula for the NERNST-ETTINGSHAUSEN-field at low temperatures is given. The N.E.-effect makes it possible to distinguish clearly between the different scattering mechanisms of current carriers.
The present work deals with measuring the N.E.effect in various pure samples of n- and p-germanium in the temperature interval of 125-650° K at a magnetic field strength of H = 7400 Ørstedt. Measuring results are shown in a diagram. In a

Žurn.techn.fis,26,fasc.10, 2195-2199 (1956) CRRD 2 / 2 PA - 1558

monocrystal of the p-type with a specific resistance of 0,18 ohm.cm the curve of the temperature dependence of $\mathcal{E}_y(T)$ consists of two parts: At $T < 390^\circ$ K, $\mathcal{E}_y > 0$ and at $T > 390^\circ$ K $\mathcal{E}_y < 0$ is true. In n-monocrystals with 0,01; 3,0 and 11 ohm.cm (all specific resistances are for 295° K) as well as in a p-monocrystal with 48,5 ohm.cm the N.E. field is negative within the entire investigated temperature range. In all samples a maximum of $\mathcal{E}_y(T)$ is found at high temperatures, where $\mathcal{E}_y < 0$ is true, which is connected with the transition from the admixture domain into the domain of actual conductivity. With the quantity of admixtures in the sample also the equilibrium temperature of holes and electrons rises, and with an increase of the mobility of the current carriers also the maximum will rise. At low temperatures the temperature dependence of the N.E.-effect is rather complicated. At the lowest temperatures N.E. field strength (as also mobility) grows with increasing temperature. At higher temperatures dispersion at the oscillations of the lattice gains in importance and the N.E. field changes its sign. Within a certain average range of temperature $\mathcal{E}_y$ can attain a maximum. In conclusion further properties and particularly the domain of actual conductivity are discussed.

INSTITUTION: Dagestan Branch of the Academy of Science in the USSR, MACHACKALA!

20-117-5-14/54

AUTHORS: Amirkhanov, Kh.I., Member of the Academy of Sciences of the Azerbaydzhan SSR, Bashirov, R.I., Dalbov, A. Z., Tsidil'kovskiy, I. M.

TITLE: The Influence of the Phonon Drag Effect on Thermomagnetic Phenomena in Bismuth Selenide (O vliyanii effekta "uvlecheniya" na termomagnitnyye yavleniya v selenide vismuta).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 117, Nr 5, pp. 781 - 784 (USSR)

ABSTRACT: The authors here investigate the electric conductivity, the Hall-effect, the thermoelectromotoric force and the transversal and longitudinal Nernst-Ettinghausen-(Ettingsgauzen)- effect of ten polycrystalline samples of bismuth-selenide. These samples were produced by a compression at high temperature or by a slow cooling of the smelting. The methods of measurements were already described in two previous papers by the author (reference 3,4). The measurements described here were conducted in the temperature interval from 12o - 7oo°K. Here the results of the examination of six samples are given. The properties of the different samples are shortly enumerated. In the case of crystals with a predominantly homoeopolar bonding (comprising bismuth-selenide) the Nernst-Ettinghausen (Ettingsgauzen) effect must be positive. The Nernst-Ettinghausen effect is caused in one of the samples of Bi_2Se_3 in the range of low temperatures investigated here mainly by the

The Influence of the Phonon Drag Effect on Thermomagnetic Phenomena in Bismuth Selenide.

drag of electrons by phonons. This presumption is verified by measuring the thermoelectromotive force. The experiments of the authors showed, that with concentrations of $N \sim 10^{18}$ cm^{-3} of the current carriers the drag has a decisive influence on the Nernst-Ettinghausen (Ettinggauzen) effect and on the thermoelectromotive force. The longitudinal Nernst-Ettinghausen (Ettinggauzen) effect was also investigated in Bi_2Se_3, it turned out to be relatively weak, however. The discrepancies between the values of mobility determined from the Hall effect and from the Nernst-Ettinghausen (Ettinggauzen) effect, (which were observed in PbS, PbSe, and PbTe at low temperatures), are obviously caused by the influence of drag on the Nernst-Ettinghausen (Ettinggauzen) effect. There are 4 figures and 15 references, 7 of which are Slavic.

ASSOCIATION: Dagestan Branch AS USSR, Makhachkala (Dagestanskiy filial Akademii nauk SSSR, Makhachkala).

SUBMITTED: June 11, 1957

BASHIROV, R.I.: Master Phys-Math Sci (diss) -- "Investigation of the Nernst-Ettinghausen thermomagnetic effect in semiconductors". Makhachkala, 1958. 14 pp, (Leningrad Phys-Tech Inst, Acad Sci USSR), 150 copies (KL, No 1, 1959, 112)

AUTHOR: Bashirov, R. I. 57-28-5-12/36

TITLE: The Investigation of the Nernst-Ettingshausen Effect in Bismuth Telluride
(Issledovaniye effekta Nernsta-Ettingsgauzena v telluride vismuta)

PERIODICAL: Zhurnal Tekhnicheskoy Fiziki, 1958, Vol. 28, Nr 5, pp. 986-989 (USSR)

ABSTRACT: Bismuth telluride belongs to the group of well conducting semiconductors with a considerable mobility of the current carriers, possessing low heat conductivity. This reveals Bi_2Te_3 to be a suitable material for the production of thermoelectric generators and cooling plants. The concentration of the current carriers in bismuth telluride is sufficiently high and the electron gas is partly in a state of degeneration. No investigations of the Nernst-Ettingshausen effect were conducted as yet. Besides, it would be possible in this case, as can be seen from a series of papers, to obtain supplementary data on the character of the interaction between the current carriers

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and the crystal lattice by the examination of this effect. In the present paper the author investigated the N.E.--effect in cast and pressed samples of bismuth telluride. The results of the measurements of the N. E.-effect are shown in figure 1. It can be seen that the curves of $\mathcal{E}_y(T)$ consist of positive and negative parts for all samples with the exception of no. 5. At a temperature rise $\mathcal{E}_y$ changes its sign, becomes negative, reaches a minimum and in further heating increases again. Assuming: $\frac{u-}{u+} = 2$ (Reference 3) and $\Delta\mathcal{E} = 0{,}20$ eV, $r = 0$, and if the temperature is known, at which $\mathcal{E}_y = 0$, that interrelation between the concentration of the electron and hole current carriers can be computed, at which an inversion of the sign takes place. The width of the forbidden zone was computed from the dependence $\ln(RT^{3/2})$ upon $\frac{1}{T}$ up to 75°K (Figure 3).

Card 2/5 The entire negative part of the curve $\mathcal{E}_y$ is conditioned

by the participation of two types of current carriers in the conductivity. The coincidence of the motions, which were determined according to Rσ and the formula:

$$\varepsilon_y = \frac{1 - r}{2} a \frac{uH}{r \quad o}$$ under the assumption, that r = 0

in the interval 140 - 300°K speaks in favor of the fact, that in this temperature range the basic cause for the dispersion of the current carriers is represented by acoustic oscillations of the crystal lattice. It is known, however, that theory predicts a current carrier mobility proportional to $T^{-3/2}$ in the case of semiconductor with homeopolar binding. One of the mechanisms causing the law $u = u_o T^{-2.3}$, this being very near $u = T^{-3/2}$, can be represented by the simultaneous collision of two instead of only one phonon. This polyphonon mechanism of collision was already proposed (Reference 6). The investigations of the N. E.-effect showed, that in bismuth telluride the case

of a pure current carrier dispersion because of acoustic oscillations of the crystal is realized at lower temperatures. This process takes place with a contribution of a sort of current carriers to conductivity and leads to the agreement predicted by theory of the mobility determined according to the N.E.-effect and to Rσ. The negative sign and the minimum of ξ_y as well as the temperature course of the electric conductivity permit to make the assertion, that Bi_2Te_3 enters the range of intrinsic conductivity at temperatures above 250°C. It must be mentioned, that in spite of a strong concentration of the current carriers in Bi_2Te_3 no influence of degeneration on the N.E.-effect was observed in the investigated temperature interval, as this had been the case in Sb_2Te_3 (Reference 5). The author is indebted to Kh. I. Amirkhanov for valuable suggestions.

There are 4 figures and 6 references, 4 of which are Soviet.

The Investigation of the Nernst-Ettingshausen Effect in Bismuth Telluride

57-28-5-12/36

ASSOCIATION: Dagestanskiy filial AN SSSR, Makhachkala
(Makhachkala, Dagestan Branch AS USSR)

SUBMITTED: June 21, 1957

1. Bismuth tellurides--Properties

Card 5/5

R. I. Bashirov

24(0) SOV/53-67-4-7/7

AUTHOR: Chentsov, R.

TITLE: The Fifth All-Union Conference on the Physics of Low Temperatures (5-ye Vsesoyuznoye soveshchaniye po fizike nizkikh temperatur)

PERIODICAL: Uspekhi fizicheskikh nauk, 1959, Vol 67, Nr 4, pp 743-750 (USSR)

ABSTRACT: This Conference took place from October 27 to November 1 at Tbilisi; it was organized by the Otdeleniye fiziko-matematicheskikh nauk Akademii nauk SSSR (Department of Physico-mathematical Sciences of the Academy of Sciences, USSR), the Akademiya nauk Gruzinskoy SSR (Academy of Sciences, Gruzinskaya SSR), and the Tbilisskiy gosudarstvennyy universitet im. Stalina (Tbilisi State University imeni Stalin). The Conference was attended by about 300 specialists from Tbilisi, Moscow, Khar'kov, Kiyev, Leningrad, Sverdlovsk, and other cities as well as by a number of young Chinese scientists at present working in the USSR. About 50 lectures were delivered which were divided according to research fields.

V. Various Questions.

One of the most interesting lectures delivered at this Conference was that by I. A. Gindin, B. G. Lazarev, Ya. D. Starodubov and V. I. Khotkevich (KhPTI) on the polymorphism of metals at low temperatures; P. L. Kapitsa commented on this topic during the discussion. R. F. Bulatova, V. S. Kogan and B. G. Lazarev (KhPTI) investigated the system hydrogen-deuterium by the methods of low-temperature-radiography, thermal analysis, and the visual observation of crystallization. Kh. I. Amirkhanov, Sh. Kh. Amirkhanova and R. I. Bashirov investigated the thermomagnetic properties of compounds of the type

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$A^{III}B^{V}$ and $A^{II}B^{VI}$, and dealt with the phenomenon of the "photon wind" predicted by Gurevich; the investigation was carried out at the Dagestanskiy filial AN SSSR (Dagestan Branch, AS USSR). N. M. Reynov and A. P. Smirnov (LFTI - Leningrad Physico-technical Institute) gave a report on the measurement of the electricity limit of tin- and indium polycrystals at very low temperatures (1°K), and N. M. Reynov and N. I. Krivko (LFTI) spoke about attempts made to find the expected diamagnetic resonance on polarons in cuprous oxide. G. R. Khutsishvili (TGU i Institut fiziki AN Gruzinskoy SSR - Tbilisi State University and Institute of Physics AS Gruzinskaya SSR) carried out a theoretical investigation of the Overhauser effect in non-metals. Lomkadze investigated the electron- and nuclear (proton) resonance in diphenylpicryl hydracyl at helium temperature. B. N. Samoylov spoke about experiments he carried out concerning the orientation of Co^{60}- and Au^{198}-nuclei (in iron) at extremely low temperatures. B. P. Zakharchenya and Ye. F. Gross (LFTI) investigated the absorption spectrum of a cuprous oxide crystal in the magnetic field at helium temperature and observed the effect of magneto-optical oscillations. V. P. Pashkov and M. P. Malkov gave information concerning scientific work of Soviet scientists in foreign countries (zagranichnaya nauchnaya komandirovka), and E. V. Shpol'skiy spoke about the abstracting journal "Fizika". The head of the department for problems of the physics of low temperatures, Academician P. L. Kapitsa and the President of the Academy of Sciences Gruzinskaya SSR, Academician N. I. Muskhelishvili closed the Conference. The 6. All-Union Conference on the Physics of Low Temperatures will be held in June and July 1959 in the city of Sverdlovsk.

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BASHIROV, R.I.

82552

S/181/60/002/007/033/042
B006/B060

24.7600

AUTHORS: Amirkhanova, D. Kh., Bashirov, R. I.

TITLE: The Effect of a Magnetic Field on the Thermal Conductivity of Indium Antimonide

PERIODICAL: Fizika tverdogo tela, 1960, Vol. 2, No. 7, pp. 1597-1607

TEXT: The authors studied the effect of a magnetic field on the thermal conductivity of five indium antimonide specimens in the range of 20-500°K. A decrease of thermal conductivity due to the magnetic field is known for metals, but is only little investigated for semiconductors. The authors wanted to obtain data in the range of greater field strengths and to compare them with theoretical results. In order to attain large uH values, the authors made use of fields up to 30,000 oersteds and specimens with an electron mobility of $u = 10^4$ cm^2/v.sec. Also the temperature dependence of thermal conductivity was measured for some of the specimens. The first part of the paper describes the method of measurement and the apparatus (Fig. 1) in detail. Results are illustrated by diagrams. Fig. 2 shows the

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The Effect of a Magnetic Field on the Thermal Conductivity of Indium Antimonide

electrical conductivity as a temperature function, and Fig. 3 the Hall constant as temperature function. The numbers near the curves (which exhibit very different courses) denote the various specimens used. Nos. 2a, 3, and 14 were n-type InSb, 1-2 and 1-3 were p-type. In the purer specimens 1-2, 2a, and 3 the range of intrinsic conductivity was above 300°K, which may be seen both from log $\sigma(10^3/T)$ (Fig. 2) and from $\log_0 R(10^3/T)$ (Fig. 3). Specimen No. 14 showed impurity conduction up to 500°K, its specific electrical conductivity attained the value 2000 $ohm^{-1}cm^{-1}$. The effect of the magnetic field on the thermal conductivity $\frac{\Delta\varkappa}{\varkappa}(H^2)$ is illustrated in Figs. 4 and 5. Fig. 6 shows $\frac{\Delta\varkappa}{\varkappa}(T)$ and Fig. 7 the variation in thermal conductivity with the temperature in the range 20 - 700°K. $\varkappa_{lattice} = f(T)$ and the same in logarithmic coordinates. For weak fields a quadratic function $\frac{\Delta\varkappa}{\varkappa} = f(H^2)$ is predicted theoretically. As can be seen from Fig. 4, $\frac{\Delta\varkappa}{\varkappa} \sim \left(\frac{uH}{c}\right)^2$ is fulfilled only in the lower region, while at $H > 6000$ oe, $\frac{\Delta\varkappa}{\varkappa}$ tends toward saturation. It follows

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The Effect of a Magnetic Field on the Thermal Conductivity of Indium Antimonide

S/181/60/002/007/033/042
B006/B060

from the theory of strong fields that with growing uH the ratio $\frac{\Delta\varkappa}{\varkappa}$ tends to unity. It follows indeed from formula (5), which describes the thermal conductivity in the magnetic field, and from the assumption of carrier scattering through lattice vibrations, that if $\frac{uH}{c} \rightarrow \infty$, and $\frac{\Delta\varkappa}{\varkappa} \rightarrow 1$ and the specimens Nos. 3, 3a, and 1-2 showed saturation of $\frac{\Delta\varkappa}{\varkappa}$ at H > 16,000 oe. The behavior of the various specimens in the various temperature ranges is described in detail. The table of p. 1604 gives several numerical data. Calculations were also made of electron contributions to the thermal conductivity $\varkappa_{el}/\varkappa$ calculated according to the Wiedemann-Franz law and the formula by Davydov-Shmushkevich, which takes account of the heat transfer due to electron and hole diffusion as well as diffusion and recombination of electron-hole pairs. $\frac{\Delta\varkappa}{\varkappa} < \frac{\varkappa_{el}}{\varkappa}$ at all temperatures. In the range of 86 - 300°K $\frac{\Delta\varkappa}{\varkappa} \sim T^{1.85}$. Pure InSb specimens at low temperatures did not reveal any influence of the field on thermal conductivity, which fact is ascribed to low

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$\frac{\varkappa_{el}}{\varkappa}$. The heat transfer in the range 20 - 700°K is mainly due to lattice vibrations (phonon-phonon processes). At 400°K $\frac{\varkappa_{el}}{\varkappa}$ starts growing important and attains 5 - 10%. The authors finally thank Kh. I. Amirkhanov and G. B. Abdullayev for their interest and useful advice. There are 7 figures, 1 table, and 11 references: 4 Soviet, 4 US, 2 British, 1 Dutch, and 1 Italian.

ASSOCIATION: Institut fiziki Dagestanskogo filiala AN SSSR (Institute of Physics of the Dagestan Branch of the AS USSR)

SUBMITTED: June 23, 1959

Card 4/4

AMIRKHANOVA, D., BASHIROV, R. I.

Heat conductivity of indium antimonide in a magnetic field. Dokl. AN Azerb. SSR 16 no.2:121-125 '60. (MIRA 13:8)

1. Institut matematiki AN AzerSSR. Predstavleno akademikom AN Azerbaydzhanskoy SSR Kh. I. Amirkhanovym.
(Indium antimonide--Thermal properties)

S/020/60/132/04/16/064
B014/B007

AUTHORS: Amirkhanov, Kh. I., Academician of the AS Azerbaydzhanskaya SSR, Bashirov, R. I., Zakiyev, Yu. E.

TITLE: Galvanometric Effects in n-InSb in Magnetic Pulsed Fields

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 132, No. 4, pp. 793-796

TEXT: In the introduction, some investigations carried out with germanium are mentioned, among them those by I. G. Fakidov and E. A. Zavadskiy (Ref. 6). The present paper contains experimentally determined data of investigations of the Hall effect carried out on five n-type indium-antimonide samples in magnetic pulsed fields with field strengths of up to 900 kilogauss. The dependence of the effects on the field strength and temperature were investigated. The dimensions of the samples are given, and the measurement of the longitudinal magnetic resistance and the transverse resistance are discussed. Fig. 1 shows the dependence of the longitudinal and the transverse magnetic resistance on the magnetic field strength for n- and p-type samples. Fig. 2 graphically represents the dependence of the Hall constant of a sample on the magnetic field

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strength, and Fig. 3 is a graphical representation of the dependences of the longitudinal and the transverse magnetic resistance for two samples. The results are inexplainable from the classical standpoint of galvanometric effects. The curves given in Figs. 1 and 2 are explained by the quantum character of the motion of electrons in the magnetic field. The author discusses this standpoint in detail and gives several formulas. The dependence of the longitudinal and the transverse magnetic resistance on temperature is brought into connection with the two scattering mechanisms acting within the temperature range of from 77°K to 200°K. The dependences of the galvanometric effects on the magnetic field described here were observed also in n-type samples of HgTe and InAs. The authors thank N. B. Brandt for taking part in the discussion of the results. There are 3 figures and 14 references, 3 of which are Soviet.

ASSOCIATION: Dagestanskiy filial Akademii nauk SSSR (Dagestan Branch of the Academy of Sciences, USSR)

SUBMITTED: March 4, 1960

9.4177
24,7600 (1043, 1158 only)

S/181/61/003/003/018/030
B102/B205

AUTHORS: Amirkhanova, D. Kh. and Bashirov, R. I.

TITLE: Nernst-Ettinghausen effect in n-type InSb

PERIODICAL: Fizika tverdogo tela, v. 3, no. 3, 1961, 819-821

TEXT: The present paper presents the results of an investigation of the transverse thermomagnetic Nernst-Ettinghausen effect as a function of the direction of the magnetic field in n-type InSb at the temperatures of liquid nitrogen and hydrogen in fields of up to 26 koe. The dimensionless Nernst-Ettinghausen field is given by

$\mathcal{E}_y = \frac{1-r}{2} a_r \left(\frac{uH}{c}\right)^{-1}$ (1), where u is the carrier mobility, c the velocity of light, r the exponent in the velocity dependence of the mean free path ($l = l_0(T)v^r$), and a_r is a coefficient depending on r. (1) is valid in the absence of orbital quantization of carriers in the magnetic field. In n-type InSb, however, the condition $\hbar\omega_0/kT > 1$ is easily realizable and invalidates (1) as well as other classical relations. Here, $\omega_0 = eH/m^*c$ is

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B102/B205

Nernst-Ettinghausen ...

the cyclotron frequency; the effective mass for n-type InSb is $m^* = 0.015\ m_o$ (m_o - free electron mass). A study has now been made of the dependence of $\mathcal{E}_y$ on H for $\hbar\omega_o > kT$. The two n-type InSb specimens studied here yielded the same results: At 77°K and 6000 oe, the specimens had an impurity carrier concentration of $n = 1.25 \cdot 10^{16}$ cm^{-3} and $R\sigma = 6 \cdot 10^4$ cm^2/v·sec. A figure illustrates the measurement of the transverse Nernst-Ettinghausen effect. Whereas, according to (1), $\mathcal{E}_y \sim H^{-1}$ was expected for $H > 10^4$ oe, $\mathcal{E}_y \sim H^{0.2}$ at 117°K and $\mathcal{E}_y \sim H^{0.5}$ at 30°K. $\mathcal{E}_y \sim H^0$ had been observed already earlier at 100°K. The mobility calculated from $uH/c = 1$ was found to be 40,000 cm^2/v·sec in accordance with the Hall mobility. The increase in $\mathcal{E}_y$ with increasing H (over 10^4 oe) is undoubtedly related to orbital quantization of the carrier motion in the magnetic field. It was really found that $\hbar\omega_o/kT > 3$ if $H > 10^4$ oe. Thus, the curve $\mathcal{E}_y(H)$ consists of two sections: a classical and a quantum-theoretical section. The quantum effects undoubtedly influence the Nernst-Ettinghausen field also at 117°K. Here, $\hbar\omega_o/kT > 1$ for

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Nernst-Ettinghausen ...

H > 13,000 oe. In the range of 30-117°K, $\mathcal{E}_y \sim T^{1.25}$ for H = 2.10^4 oe. Also this fact cannot be explained by (1). The course of the $\mathcal{E}_y(T)$ curve indicates that the specimen was degenerate. In view of this fact, one obtains $\mathcal{E}_y = K_2(\mu^*)(\mu H/c)^{-1}$ instead of (1). Here, $K_2(\mu^*)$ is a function depending on the scattering mechanism and the reduced chemical potential ($\mu^* = \mu/kT$); on a change from 117°K to 30°K, μ^* changes from -0.5 to +5, and $K_2(\mu^*)$ drops to one-third of its value. A decrease of the Nernst-Ettinghausen field to one-fifth of its value on a change from 117 to 30°K could be observed by the present authors and was ascribed to the effect of quantization. The transverse magnetic resistivity $\Delta\varrho/\varrho_0$ increases at 77 and 20°K with increasing H, without tending toward saturation. This observation was also ascribed to a quantum effect. Professor Kh. I. Amirkhanov is thanked for suggesting the topic and for discussions. This is the reproduction of a report held at the Conference on Low-temperature Physics, Khar'kov, June 23-28, 1960. There are 1 figure and 6 references: 5 Soviet-bloc and 1 non-Soviet-bloc.

Card 3/3 Dagestan Affil, Acad Sci USSR

24.7600 (1035, 1137, 1043)

32091
S/181/61/003/012/026/028
B125/B108

AUTHORS: Amirkhanov, Kh. I., Bashirov, R. I., and Gadzhialiyev, M. M.

TITLE: Quantum thermomagnetic Nernst-Ettingshausen effects in n-type InSb and n-type InAs

PERIODICAL: Fizika tverdogo tela, v. 3, no. 12, 1961, 3743 - 3745

TEXT: Longitudinal and transverse Nernst-Ettingshausen effects in three non-degenerate specimens of n-type InSb:

(1) InSb specimen ГII-1, $n = 6.8 \cdot 10^{13}$ cm^{-3}, $R\sigma = 310{,}000$ $cm^2/v \cdot sec.$;

(2) InSb specimen ГII-2, $n = 8.8 \cdot 10^{13}$ cm^{-3}, $R\sigma = 161{,}000$ $cm^2/v \cdot sec.$;

(3) InSb specimen IV-38n, $n = 1.15 \cdot 10^{15}$ cm^{-3}, $R\sigma = 84{,}200$ $cm^2/v \cdot sec.$,

and in one degenerate specimen of n-type InAs ($n = 1.6 \cdot 10^{16}$ cm^{-3},

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$R\sigma = 35{,}800\ cm^2/v.sec$) as functions of the magnetic field strength were investigated at hydrogen temperatures with a low-resistance potentiometer and a sensitive galvanometer. The field dependence of the longitudinal and transverse Nernst-Ettingshausen effects are shown in Figs. 1 and 2, respectively. The dimensionless field of the Nernst-Ettingshausen effect satisfies $E_x = (|\alpha_H| - |\alpha_o|)/(k/e)$, where α_H and α_o are the differential thermo-emf with and without a magnetic field, respectively. The effective electron mass in InSb is assumed to be $m^* = 0.012\ m_o$. Measurements at above 20 koe were made in the interval 22 - 33°K which lies around the quantum limit $\hbar\omega_o \gg kT$, where $\omega_o = eH/m^*c$ is the cyclotron frequency. According to A. I. Ansel'm and B. M. Askerov (FTT, 3, 3672, 1961), the field strength of the transverse effect in classical statistics amounts to $E_y \sim H^0$ for carrier scattering from acoustic vibrations, and to $E_y \sim H^2$

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Quantum thermomagnetic ...

for scattering from the short-range potential. The longitudinal Nernst-Ettingshausen effect is positive ($E_x > 0$), and its absolute value increases with the magnetic field within the quantum region, especially around 25 koe. The sign of E_x changes between 10 - 20 koe, where the carriers are scattered mainly from ions. The sign is negative in the region $kT < \hbar\omega_0$. The transverse Nernst-Ettingshausen effect is negative and described by $E_y = \frac{1-r}{2} a_r'(\frac{uH}{c})^{-1}$ for $\omega_0\tau \gg 1$ (τ = carrier relaxation time) and $\hbar\omega_0 \ll kT$. r is the power in $l \sim v^r$, l the mean free path, v the carrier velocity, u their mobility, and a_r' a coefficient depending on r. In the specimens investigated, carrier scattering from impurity ions is predominant near 20°K. The condition of the quantum limit is not satisfied for the degenerate InAs sample at 39°K. Quantization affects the Nernst-Ettingshausen effect at $H \geq 10^4$ oe. There are two figures and 4

4

Card 3/4

Quantum thermomagnetic ...

references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: H. P. R. Frederikse a. W. R. Hosler. Phys. Rev., 108, 1136, 1960.

ASSOCIATION: Dagestanskiy filial AN SSSR Makhachkala (Dagestan Branch of the AS USSR, Makhachkala)

SUBMITTED: June 12, 1961 (initially) and August 23 (after revision)

Fig. 1. Longitudinal Nernst-Ettingshausen effect E_x as a function of magnetic field strength in InSb and InAs.
Fig. 2. Transverse Nernst-Ettingshausen effect E_y as a function of magnetic field strength for InSb and InAs. 1 -InSb[II-1, 22°K. The other denotations are the same as in Fig. 1.

Card 4/4

AMIRKHANOV, Kh.I.; BASHIROV, R.I.; GADZHIALIYEV, M.M.

Quantum thermomagnetic Nernst-Ettinghausen effects in n-InSb and n-InAs. Fiz. tver. tela 3 no.12:3743-3745 D '61. (MIRA 14:12)

1. Dagestanskiy filial AN SSSR, Makhachkala.
(Thermomagnetism) (Indium antimonide)
(Indium arsenide)

31765
S/056/61/041/006/001/054
B108/B138

24,2200 (1160, 1164, 1147)

AUTHORS: Amirkhanov, Kh. I., Bashirov, R. I., Zakiyev, Yu. E.

TITLE: Quantum galvanomagnetic effects in n-type InAs

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 41, no. 6(12), 1961, 1699-1703

TEXT: Hall effect and resistivity were studied in a n-type InAs strong pulsed magnetic field at temperatures from 20 to 360°K. A magnetic field of up to 450,000 gauss was achieved by discharging a 1200-μF capacitor block through a beryllium bronze coil. The relative change in resistivity in a pulsed magnetic field does not depend on the length-to-width ratio of the specimens where this is greater than 10. The specimens studied had impurity concentrations of about $3 \cdot 10^{16}$ cm^{-3} and $2 \cdot 10^{18}$ cm^{-3}. Figs. 3 and 4 show the results of measurements of Hall constant R and resistivity in a transverse magnetic field for two kinds of samples: Γ_1 (G_1)-type InAs with a conductivity of 175 ohm^{-1} cm^{-1} and R = 200 $cm^3 C^{-1}$ at 77°K, and

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31765
S/056/61/041/006/001/054
B108/B138

Quantum galvanomagnetic effects in...

M-13 (M-13)-type InAs with σ = 2870 $ohm^{-1}cm^{-1}$ and R = 3 cm^3C^{-1} at 77°K. In G1-type specimens at 300 and at 77°K Hall constant was independent of the magnetic field strength up to 400,000 gauss. At 20°K it was constant in fields of up to 160,000 gauss and then rose slightly, due to the fact that at H > 160,000 gauss the activation energy of the impurities is greater than the mean energy of the free electrons. Therefore, the carrier equilibrium concentration decreases. In the strongly degenerate M-13-type specimens at 20°K Hall constant did not change in a magnetic field, owing to overlapping of the conduction band and of impurity levels. It is pointed out that InAs could be used as a pickup in magnetic-field strength measurements. Scattering of carriers in G1-type InAs has a mixed phonon-ion character. In the range 20-77°K a strong magnetic field reduces the degeneracy which is marked by only a slight dependence of $\Delta\varrho/\varrho_0$ on H. This becomes stronger if the concentration of the equilibrium carriers decreases (M. I. Klinger, P. I. Voronyuk. ZhETF, 33, 77, 1957). There are 4 figures and 13 references: 5 Soviet and 8 non-Soviet. The three most recent references to English-language publications read as follows: P. N. Argyres. J. Phys. Chem. Solids, 8, 124, 1959; E. N. Adams.

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Quantum galvanomagnetic effects in...

T. D. Holstein. J. Phys. Chem. Solids, 10, 254, 1959; J. R. Dixon, D. P. Eright. J. Appl. Phys., 30, 733, 1959.

ASSOCIATION: Dagestanskiy filial Akademii nauk SSSR (Dagestan Branch of the Academy of Sciences USSR)

SUBMITTED: February 5, 1961 (initially)
July 25, 1961 (after revision)

Fig. 3. Resistance versus magnetic field strength.

Legend: (a), (b), (b') for G1-type InAs, (c) for M-13-type InAs. Abscissa - $H \cdot 10^3$ gauss.

Fig. 4. G1-type InAs.

Legend: (a) resistance versus temperature (H = 252,000 gauss), (b) Hall constant versus magnetic field strength (T = 20°K), (c) resistance versus magnetic field strength (T = 20°K). Abscissa - $H \cdot 10^3$ gauss; T, degree K.

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AMIRKHANOV, Kh.I.; BASHIROV, R.I.; ZAKIYEV, Yu.E.

Variation of resistance in high magnetic fields in n-type indium arsenide. Fiz. tver. tela 5 no.2:469-474 F '63. (MIRA 16:5)

1. Institut fiziki Dagestanskogo filiala AN SSSR, Makhachkala.
(Indium arsenide—Electric properties) (Magnetic fields)

AMIRKHANOV, Kh.I.; BASHIROV, R.I.; ISMAILOV, Z.A.

Hall effect in indium antimonide in high pulsed magnetic fields.
Fiz. tver. tela 5 no.10:2832-2834 O '63. (MIRA 16:11)

1. Institut fiziki Dagestanskogo filiala AN SSSR, Makhachkala.

AID Nr. 960-11 7 May

QUANTUM OSCILLATIONS OF MAGNETIC RESISTANCE OF n-InSb IN STRONG PULSED MAGNETIC FIELDS

Amirkhanov, Kh. I., R. I. Bashirov, and Yu. E. Zakiyev. IN: Akademiya nauk SSSR. Doklady, v. 148, no. 6, 21 Feb 1963, 1279-1282.

S/020/63/148/006/007/023

Pulsed magnetic fields of up to 400 koe have been used to determine the dependence of the longitudinal and transverse magnetic resistance of InSb single crystal samples of varying purity on [illegible] magnetic field. The purpose was to investigate the Shubnikov-de Haas effect in strong magnetic fields. The results are explained by the [illegible] theory and with [illegible] within the range of experimental errors [illegible] theory and with results obtained previously by other methods. It is shown that with [illegible] nature of the InSb conductivity zone

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AMIRKHANOVA, D.Kh.; BASHIROV, R.I.

Phonon entrainment in indium and gallium antimonides. Izv. AN Azerb. SSR. Ser. fiz.-mat. i tekh. [illegible]-65 '63.
(MIRA 17:3)

ACCESSION NR: AP4043389 S/0181/64/006/008/2534/2535

AUTHORS: Amirkhanov, Kh. I.; Bashirov, R. I.; Ismailov, Z. A.

TITLE: Resistance of p-InSb in strong magnetic field

SOURCE: Fizika tverdogo tela, v. 6, no. 8, 1964, 2534-2535

TOPIC TAGS: galvanomagnetic property, indium antimonide, transport property, valence band, carrier scattering

ABSTRACT: Although little attention has been paid heretofore to the magnetoresistance of p-type indium antimonide in strong magnetic fields, this problem is of interest both for the theory of transport phenomena and for the determination of the energy structure of the valence band and the mechanism of hole scattering. The authors investigated the resistance of several single-crystal p-InSb samples in transverse and longitudinal pulsed magnetic field up to 400 kOe at temperatures 20 and 77K. The resistances of the samples were

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ACCESSION NR: AP4043389

measured at two current and field directions in the region where Ohm's law is satisfied. The results are reported for three samples at 77K. The relative resistance increases in all cases with the magnetic field, and upon reaching approximately 400 kOe it becomes proportional to the applied constant magnetic field. "The authors thank the laboratory staff members T. S. Barnitskaya and L. I. Belan for supplying the single crystals of the indium-antimony alloy." Orig. art. has: 1 figure and 1 table.

ASSOCIATION: Institut fiziki Dagestanskogo filiala AN SSSR, Makhachkala (Institute of Physics, Dagestan Branch, AN SSSR)

SUBMITTED: 28Jan64 ENCL: 01

SUB CODE: SS NR REF SOV: 000 OTHER: 002

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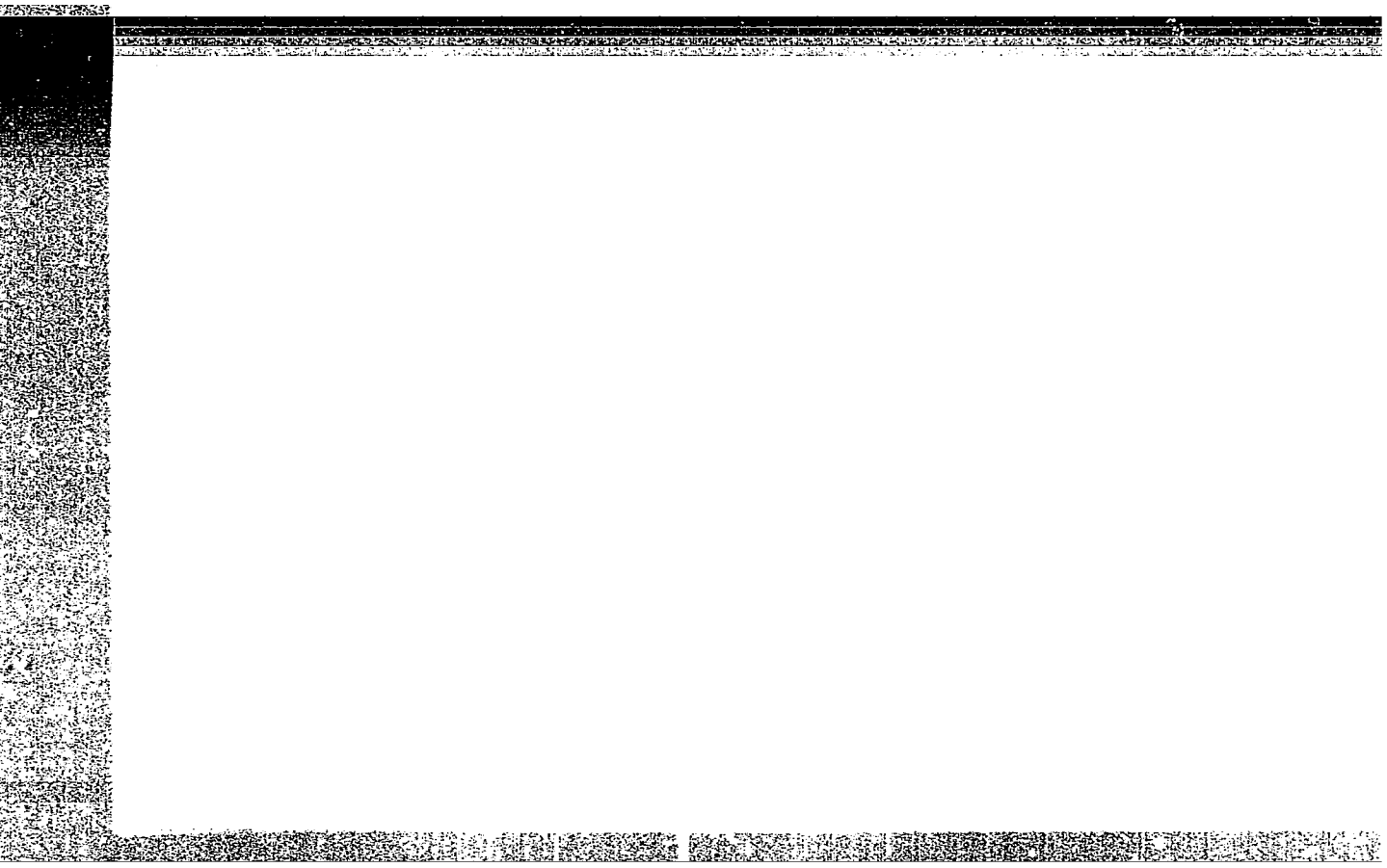

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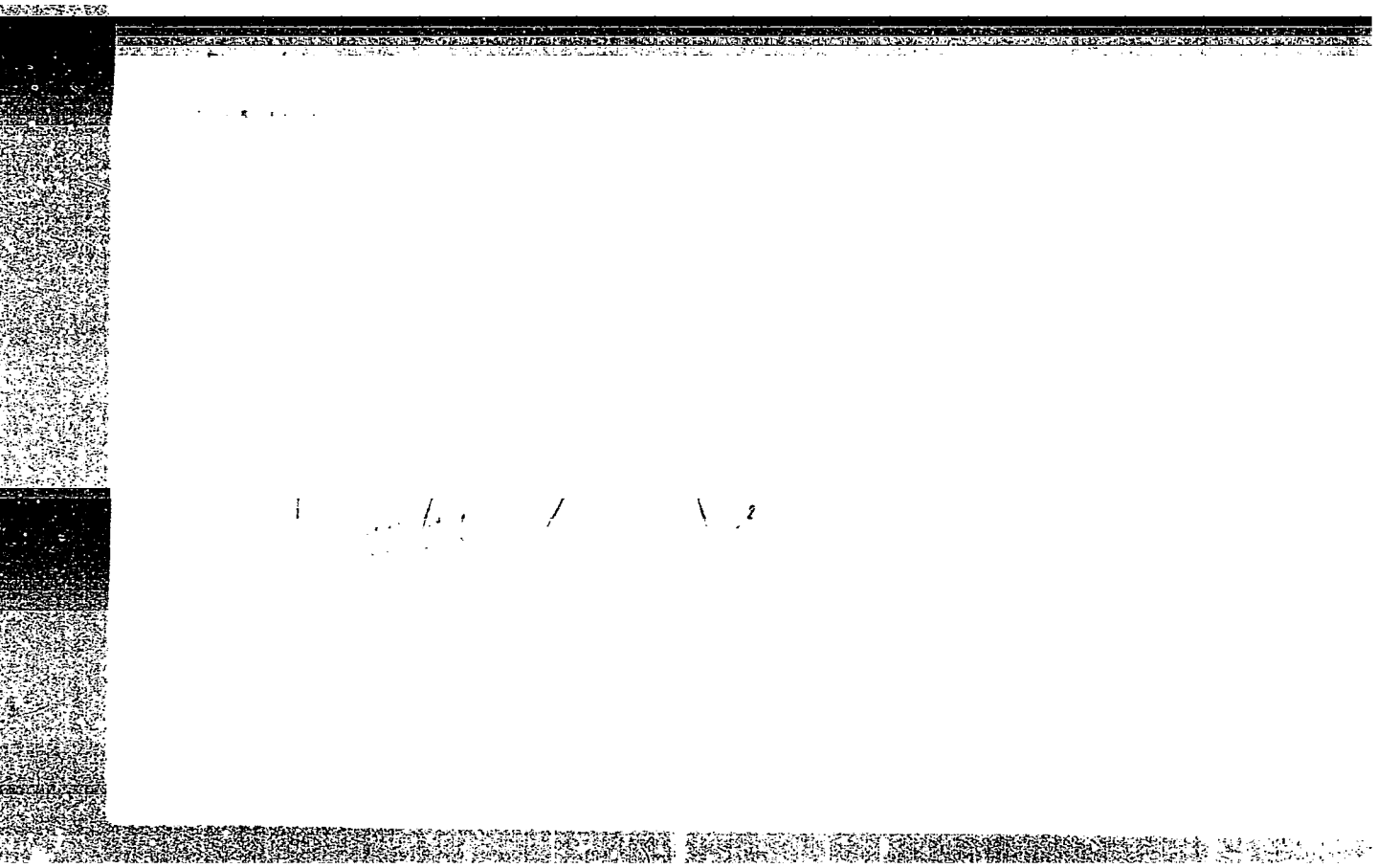

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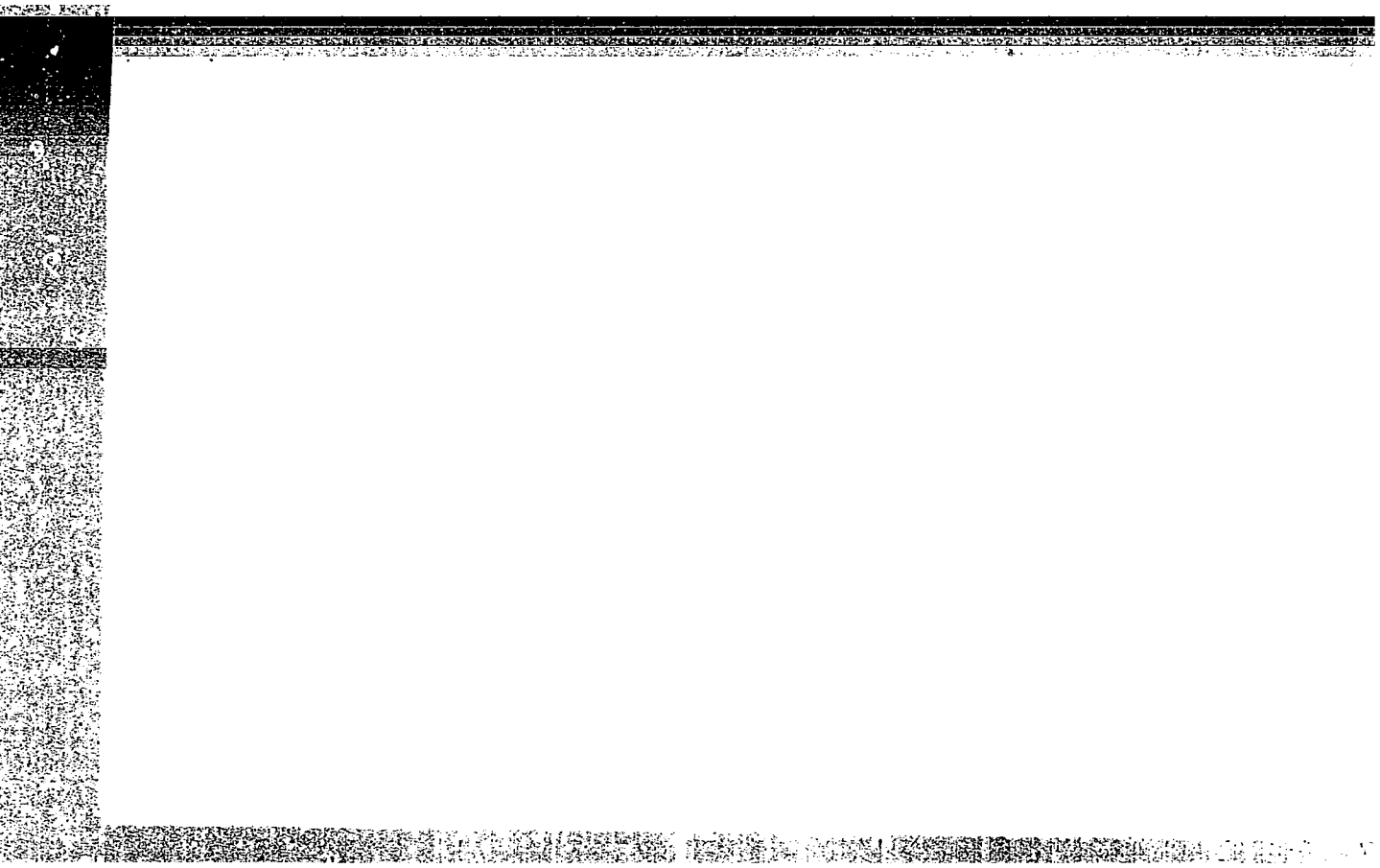

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L 01291-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5021738 UR/0386/65/002/002/0100/0102

AUTHOR: Amirkhanov, Kh. I.; Bashirov, R. I.

TITLE: Effect of spin on longitudinal magnetoresistance in indium antimonide at 4.2°K

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki. Pis'ma v redaktsiyu. Prilozheniye, v. 2, no. 2, 1965, 100-102

TOPIC TAGS: magnetoresistance, indium compound, antimonide

ABSTRACT: Experimental evidence is given for the effect of spin on quantum oscillations of longitudinal magnetoresistance in specimens of indium antimonide at 4.2°K. Results of measurements of $\Delta\rho_{11}/\rho_0(H)$ for three specimens are given in fig. 1 of the Enclosure. Curves for longitudinal and transverse magnetoresistance of specimen No 3 are given in fig. 2 of the Enclosure. These data confirm the theory of longitudinal magnetoresistance developed by A. L. Efros (*FTT*, 7, 1501, 1965). Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki Dagestanskogo filiala Akademii nauk SSSR, Makhachkala

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L 01291-66

ACCESSION NR: AP5021738

(Institute of Physics, Dagestan Affiliate, Academy of Sciences SSSR)

SUBMITTED: 04Jun65 ENCL: 02 SUB CODE: EM

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